



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,073	03/25/2004	Christopher Parks	87135PCW	6988
7590 Pamela R. Crocker Patent Legal Staff Eastman Kodak Company 343 State Street Rochester, NY 14650-2201				
EXAMINER				
WANG, KIENT F				
ART UNIT		PAPER NUMBER		
2622				
MAIL DATE		DELIVERY MODE		
01/16/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/809,073

Applicant(s)

PARKS, CHRISTOPHER

Examiner

KENT WANG

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10, 12 and 14-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10, 12, and 14-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendments, filed on 12/15/2008, have been entered and made of record. Claims 10, 12, and 14-22 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 10, 12, and 14-22 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

3. The drawings, replacement sheets for FIG. 7 and FIG. 20 received on 12/15/2008, are objected to because of for example – the hand writing, hand drawing lines and hand drawing circle in the figures are not acceptable. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each

drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 10, 12, 14-15, 17, and 19-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Komiya (US 5,335,075) in view of Sayag (US 5,055,667), and further in view of Ewedemi (US 6,831,684).

Regarding claim 10, Komiya discloses a camera (an electronic camera) comprising an image sensor (a charge modulation device CMD 39, Fig 20) comprising a plurality of pixels

in which at least two or more pixels have a charge control structure (condition setting circuit 64, Fig 20) used to change charge capacity during an integration time (col. 12, lines 27-54);

Komiya does not disclose at substantially a beginning of the integration time the charge capacity is altered to substantially zero by either the charge control structure or a read-out mechanism and the charge capacity is changed by the charge control structure throughout the integration time such that substantially no portion of the pixel photo response curve is substantially linear. However, Sayag discloses at substantially a beginning of the integration time the charge capacity is altered to substantially zero (straight line 42 is tangent to the curve 41 at the origin) by either the charge control structure (line 42 represents the charge accumulation curve for a predetermined constant incident light intensity I_0) and the charge capacity is changed by the charge control structure throughout the integration time such that substantially no portion of the pixel photo response curve is substantially linear (as the curve 41 of Fig 4 represents the maximum acceptable charge desired to be accumulated in the photogate region at any fraction of the integration period and a varying potential is applied to integration control gate 23 such that the charge in the photogate accumulates at the maximum permissible rate, i.e., along curve 41 in Fig 4) (col. 5, line 10 to col. 6, line 10, Sayag).

Komiya and Sayag are analogous art because they are from the same field of having an image sensing apparatus with exposure level and dynamic range control circuit. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose the non-linear photosite response as taught by Sayag, so as the function of maximum acceptable charge level can be mathematically determined and electronically generated on the chip so as to achieve a compression of the dynamic range in an arbitrarily

chosen manner, thus the potential at the output of the device is directly proportional to the charge transferred to the transport gate (col. 5, lines 10-35 and col. 7, lines 19-23, Sayag).

Komiya and Sayag do not disclose means for multiplying each pixel by a constant value determined for that pixel to compensate for variations of the charge capacity such that all pixel photo response curves are substantially equal. However, Ewedemi discloses means (pixel normalization circuit 112, Fig 1) for multiplying each pixel by a constant value determined for that pixel to compensate for variations of the charge capacity such that all pixel photo response curves are substantially equal (multiple sampling normalization assumes that the pixel value's response to light over time is linear, as the multiple sampling normalization is achieved by multiplying the pixel value by a constant corresponding to the ratio of the total exposure time to the time the pixel saturates) (12:7-54, Ewedemi).

And at the time of the invention, it would have been further obvious to a person of the ordinary skill in the art to use Ewedemi's pixel normalization process in Komiya and Sayag's image sensor device. The suggestion/motivation would have been to enable the pixel normalization circuit performs multiple sampling normalization operation on the pixel data based on the pixel value and the time index values stored for each pixel and providing the rearranged pixel data as output signals, thus provides high speed conversion and conserves circuit area (12:38-47, Ewedemi).

Regarding claim 12, Komiya discloses the charge capacity control structure (condition setting circuit 64, Fig 20) is pulsed so as to substantially reproduce the photo response curve (when time t_2 has passed, the signal is read out and reset is performed) (col. 14, line 67 to col. 15, line 10).

Regarding claim 14, Komiya discloses a look up table (“five readouts are performed when data accumulated at the accumulator” gave implicit that a table is inherent in the system) to translate the photo response curve into linear space for color filter processing (nonlinear accumulation data F_0 is converted to be linear as shown by F_1 in Fig 22) (col. 15, lines 21-41).

Regarding claim 15, Komiya discloses the constant values are stored in a digital camera (for mode B of photographing mode, the number of accumulations is kept at a constant value n_C) (col. 9, line 55 to col. 10, line 12).

Regarding claim 17, Komiya discloses the image sensor (a charge modulation device CMD 39, Fig 20) is disposed in a digital camera that includes a mechanism (linear conversion circuit 88) to switch between linear and nonlinear photo response (nonlinear accumulation data F_0 is converted to be linear as shown by F_1 in Fig 22) (col. 15, lines 21-41).

Regarding claim 19, this claim differs from claim 10 only in that the claim 10 is an apparatus claim whereas claim 19 is a method. Thus the method claim 19 is analyzed and rejected as previously discussed with respect to claim 10 above.

Regarding claims 20, 21, and 22, these claims recite same limitations as claims 14, 12, and 15, respectively. Thus they are analyzed and rejected as previously discussed with respect to claims 14, 12, and 15 above.

6. Claims 16 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Komiya in view of Sayag and Ewedemi, and further in view of Juen, US 5,341,220.

Regarding claim 16, the limitations of claim 10 are taught above, Komiya, Sayag, and Ewedemi disclose an image sensor comprising a charge control structure used to change charge capacity during the integration time. Komiya does not disclose the capacity control structure is adjusted to produce the desired photo response curve substantially entirely within the duration of a flash lamp exposure.

Juen discloses the capacity control structure (vertical overflow drain structure) which is adjusted to produce the desired photo response curve substantially entirely within the duration of a flash lamp exposure (flash light unit 13 is made ready to emit light) (col. 8, line 64 to col. 9, line 13, Juen).

Komiya, Sayag, Ewedemi and Juen are analogous art because they are from the same field of time integrating image sensors. At the time of the invention, it would have been obvious to a person of the ordinary skill in the art to choose Juen's flash light unit. The suggestion/motivation would have been to enable the system to provide an auxiliary illumination in case of need during the entire duration of flash lamp exposure (col. 5, lines 16-21, Juen).

Regarding claim 18, the limitations of claim 10 are taught above, the Komiya, Sayag, and Ewedemi references do not specifically teach that CCD in which images are substantially read out of a vertical CCD before starting the integration in photodiodes of any next images. However Juen does teach the image sensor as a CCD in which images are substantially read out of a vertical CCD (vertical transfer register 44, Figs 4-5) before starting the integration in photodiodes of any next images (col. 13, lines 24-37, Juen).

Thus, it would have been obvious to one of ordinary skill in the art to have included the image sensor as taught by Juen, as to make it possible to accurately measure only the very small photo current flowing out from the photoelectric charge storage layer (col. 13, lines 52-59, Juen).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:
- Silverstein (US 2003/0142374) provides an apparatus for calibrating an output of an image output device and includes an image input device configured to capture the output of the image device, and
 - Gallagher et al. (US 7,068,396) discloses a method and apparatus for performing tone scale modifications on a sparsely sampled extended dynamic range digital image.

Inquiries

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kent Wang whose telephone number is 571-270-1703. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-270-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tuan V Ho/
Primary Examiner, Art Unit 2622

KW
14 January 2009